


 PRODUCT
 INFORMATION

 BRAND Cooling Block and
 Liquid Handling Station

BRAND Cooling Blocks

Passive cooling of liquids in PCR and micro tubes in the BRAND Liquid Handling Station

Overview

Whether in a small or large laboratory, or for manual or automatic liquid handling – the cooling of liquids is essential for many biological applications.

In this Technical Note, the cooling capacity of the BRAND Cooling Blocks passive cooling system is demonstrated using the 1.5 ml and 96-well versions as examples. The pipetteability of the cooled liquids is also examined.

This allows liquids to be stored cooled for up to 3 hours regardless of their well position and pipetted in the Liquid Handling Station.

With the BRAND Cooling Blocks, BRAND offers a viable alternative to expensive, high-maintenance active cooling systems.

Introduction

The cooling of liquids is essential for numerous biological applications – for example, to protect valuable samples from microbial degradation or to prevent the loss of activity of biologically active molecules. In automation, active cooling systems are often used to keep samples below 7 °C over longer periods of time. BRAND now offers the BRAND Cooling Blocks passive cooling system for 0.5 ml (709510), 1.5 ml (709511), and 5 ml micro tubes (709512) as well as Cooling Blocks in 96- and 384-well PCR format (709513 and 709514) for automation.

In this Technical Note, the cooling performance of the cooling blocks is shown using the 1.5 ml micro tube and 96-well PCR variants as examples. It is also shown how long liquids stored in BRAND Cooling Blocks can be pipetted in the Liquid Handling Station in a cooled state.

Material and methods

Description	Manufacturer Supplier	Item number
Deionized water		
98 % ethanol	VWR	
40% and 20 % glycerol	VWR	24.388.260
Serum consisting of 1 % albumin and 0.001 % Triton X consisting of: Albumin fraction > 98% powder bovine M = 69.000	Carl Roth	8076.2
Triton X 100 extra pure		3051.3
Liquid Handling Station	BRAND	709400
Liquid End single-channel, 10 – 200 µl	BRAND	709413
Liquid End single-channel, 40 – 1000 µl	BRAND	709416
Robotic tips, 10 – 200 µl	BRAND	732148
Robotic tips, 40 – 1000 µl	BRAND	732152
Transferpettor, digital type, 10 – 50 µl	BRAND	701817
Transferpette S-8, variable type, 20 – 200 µl	BRAND	703710
Transferpette S, variable type, 2 – 20 µl	BRAND	704778
PCR-Platte, 96-Well, non-skirted	BRAND	781368
Micro tube with lid lock, 1.5 ml	BRAND	780540
1.5 ml Cooling Block	BRAND	709511
96-Well PCR Cooling Block	BRAND	709513

1. The BRAND Cooling Blocks are frozen upside down in the freezer for 12 hours at approx. -20 °C to -23 °C as described in the operating manual.
2. The media used (deionized water, ethanol, glycerol, and serum) are stored overnight in the refrigerator at 3 – 5 °C before the experiment is performed.
3. A Cooling Block is positioned on the Work Table of a BRAND Liquid Handling Station.
4. 1.5 ml of liquid is pipetted into each 1.5 ml micro tube and 200 µl of liquid into each well of the PCR plate.
5. In a first test, the VOLTcraft digital thermometer (K 102 nickel chromium nickel thermocouple, d = 1 mm) is used to measure the temperature of the liquids over time and (if the media are partially or completely frozen) how long the media can be cooled (< 7 °C) and pipetted in the BRAND Liquid Handling Station.
6. In a second test, the temperature curves of the corner, center, and edge wells are compared using the 1.5 ml tube Cooling Block variant as an example.



BRAND Cooling Blocks

Results and discussion



Cooling capacity of the BRAND 96-well PCR Cooling Block



Cooling capacity of the BRAND 1.5 ml tube Cooling Block

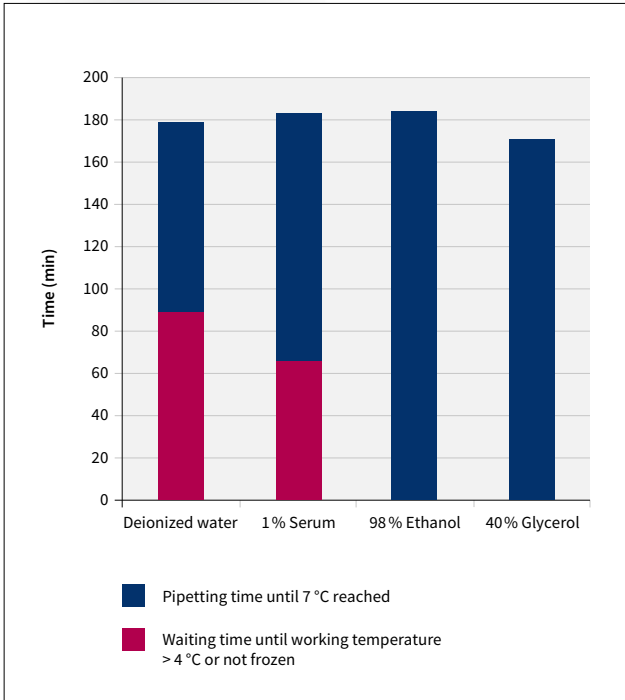


Figure 1
Cooling capacity of the BRAND 96-well PCR Cooling Block when using the BRAND 96-well PCR plate (781368) and different media (200 µl).

Shown are the waiting time (if the medium freezes) and time span in which the cooled liquid can be pipetted (< 7 °C).

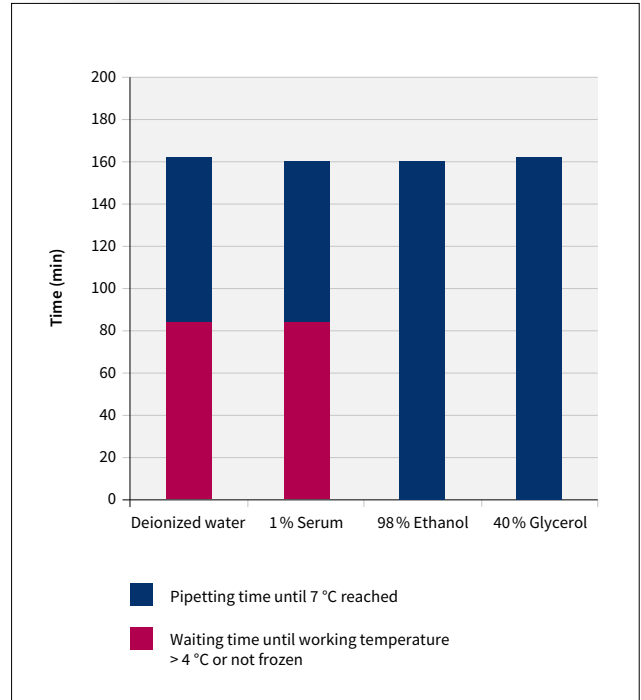


Figure 2
Cooling capacity of the BRAND 1.5 ml tube Cooling block when using BRAND micro tubes (780540) and different media (1.5 ml).

Shown are the waiting time (if the medium freezes) and time span in which the cooled liquid can be pipetted (< 7 °C).

Medium	Waiting time (min) Medium not frozen	Pipetting time until 7 °C (min)
Deionized water	90	88.6
Serum 1%	66	117.9
Ethanol 98%	0	183.8
Glycerol 40%	0	171.2

Table 1
Use of the BRAND 96-well PCR Cooling Block to cool different media (200 µl) in the BRAND 96-well PCR plate (781368).

Shown are the waiting time (if the medium freezes) and time span in which the cooled liquid can be pipetted (< 7 °C).

Medium	Waiting time (min) Medium not frozen	Pipetting time until 7 °C (min)
Deionized water	84	77.9
Serum 1%	84	76.4
Ethanol 98%	0	159.7
Glycerol 40%	0	161.6

Table 2
Use of the BRAND 1.5 ml tube Cooling Block for cooling different media (1.5 ml) in BRAND micro tubes (780540).

Shown are the waiting time (if the medium freezes) and time span in which the cooled liquid can be pipetted (< 7 °C).

In general, it has been shown that the passive cooling system BRAND Cooling Blocks can keep the liquids in micro tubes or 96-well PCR plates below 7 °C for far longer than two hours (Figure 1 and Figure 2, page 3).

When using the Cooling Blocks to cool liquids with a comparatively high freezing point (e.g. deionized water or aqueous liquids with no or few freezing point-lowering additives), ice crystal formation may occur through freezing. For these media, a waiting time of 60 to 90 min must be observed until an optimal working temperature (< 4 °C) for pipetting is reached (waiting times are shown in Figure 1 and Figure 2, page 3). These liquids can then be reliably pipetted cooled for at least 76 min (see Table 2: serum in 1.5 ml micro tubes, page 3) in the Liquid Handling Station (Table 1 and Table 2, page 3). In BRAND Cooling Blocks, liquids with low freezing points

(e.g. 40 % glycerol solution and ethanol) can be stored and pipetted cooled below 7 °C up to 160 min in 1.5 ml micro tubes and up to 180 min in 96-well PCR plates; waiting times are not necessary (Table 1 and Table 2, page 3).

The cooling curves of the edge, corner, and center wells of a 1.5 ml tube Cooling Block (reaction vessels filled with 1.5 ml 20 % glycerol solution) run very uniformly (Figure 3, page 4). A homogeneous cooling performance can therefore be assumed across all wells (which could also be shown for the other Cooling Block variants in further tests).

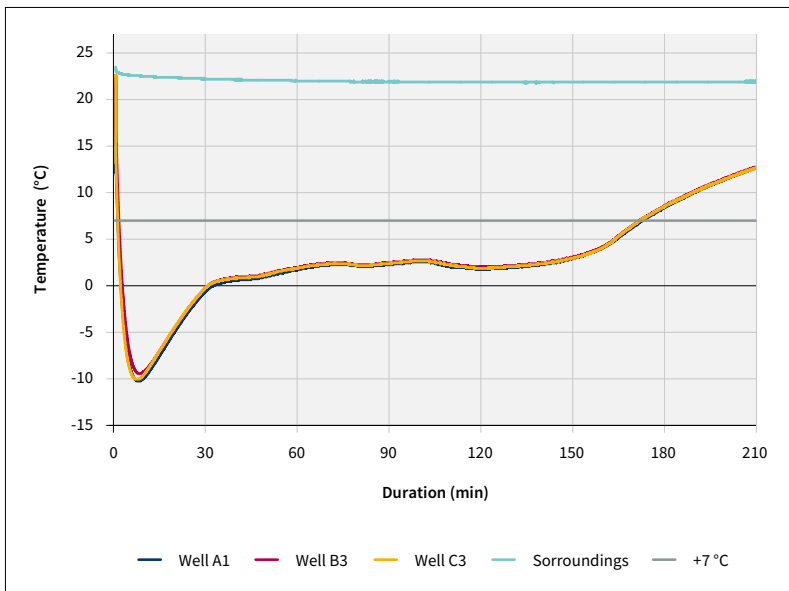


Figure 3
Cooling curves of the BRAND 1.5 ml Cooling Block.

Shown are the temperature curves in wells A1 (blue), B3 (magenta), and C3 (yellow) in the BRAND 1.5 ml Cooling Block. All wells are filled with 1.5 ml of a 20 % glycerol solution. The ambient temperature in the Liquid Handling Station is light blue. The threshold temperature of 7 °C is shown in gray.

Conclusion

BRAND Cooling Blocks allow liquids to be stored and pipetted in a cooled state in the Liquid Handling Station (between at least 76 minutes and for up to 3 hours) – regardless of the

well position. They are therefore an effective alternative to active cooling systems.



All product information can be found at shop.brand.de

BRAND GMBH + CO KG

P.O. Box 1155 | 97861 Wertheim | Germany

T +49 9342 808 0 | F +49 9342 808 98000 | info@brand.de | www.brand.de



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BRAND (Shanghai) Trading Co., Ltd.
Shanghai, China

Tel.: +86 21 6422 2318
info@brand.com.cn
www.brand.cn.com

BRAND Scientific Equipment Pvt. Ltd.
Mumbai, India

Tel.: +91 22 42957790
customersupport@brand.co.in
www.brand.co.in

BrandTech® Scientific, Inc.
Essex, CT. United States of America

Tel.: +1 860 767 2562
info@brandtech.com
www.brandtech.com